PMCD
Program Manager for Chemical Demilitarization

information

Portable Isotopic Neutron Spectroscopy (PINS)

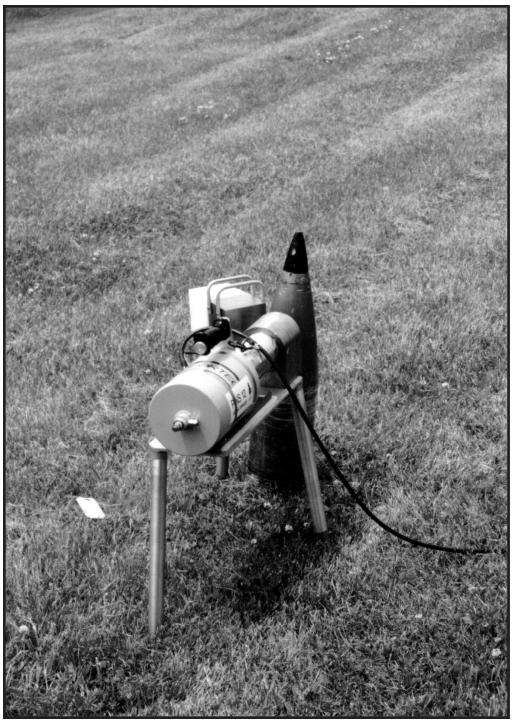
The Portable Isotopic Neutron Spectroscopy (PINS) provides the capability to identify elements within closed munitions by detecting gamma rays which are similar to x-rays. All chemical compounds are composed of two or more elements. The presence and relative concentration of a specific chemical element can be determined from the characteristic gamma-ray peaks. Analyzing the characteristic gamma-ray peaks potentially allows for the identification of compounds.

Identification of specific chemicals inside of closed containers will enhance safety and expedite disposal of non-stockpile chemical warfare materiel.

The PINS system uses three primary pieces of equipment to identify elements. The first, a neutron source, is located near the item being analyzed. Some of these neutrons penetrate the munitions's shell and interact with the contents. The second piece of equipment is a gamma-ray detector. This piece of equipment monitors the energies and intensities of gamma-rays released by neutron interactions. In addition, a multi-channel analyzer supplies power and receives electrical impulses from the gamma-ray detector.

The voltage of each pulse is proportional to the gamma-ray energy. These pulses are amplified and sorted according to voltage into many channels. While sorting, information is converted from continuous data to specific digital data which appear on a computer screen as an energy spectrum.

Characteristic gamma-ray peaks in the energy spectrum allow the presence and relative concentration of a specific chemical element to be determined.



For more information, contact the Public Outreach and Information Office of the Program Manager for Chemical Demilitarization at 1. 800.488.0648